

Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

1 m² of melamine faced Medium Density Fiberboard (MDF)

EPD of multiple products, based on a representative product from
Cleaf S.p.A.



The complete list of products can be found in the Product Information section

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products from a company
EPD registration number:	EPD-IES-0025872:001
Version date:	2025-09-23
Validity date:	2030-09-22

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com



GENERAL INFORMATION

Programme Information	
Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 v2.0.1
PCR review was conducted by: <i>Technical committee of the International EPD® System</i>
c-PCR: <i>Wood and wood-based products for use in construction, c-PCR-006, version 1.0.0</i>

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
☒ Individual EPD verification without a pre-verified LCA/EPD tool Third-party verifier: Guido Croce Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

Technical support and LCA study development: Studio Fieschi & Soci S.r.l. – www.studiofieschi.it

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.

For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD: Cleaf S.p.A.

Address: Via Bottego 15 20851 Lissone MB Italia

Contact: Lorena De Sario, Quality and After-Sales Services Manager

LCA practitioner:

Giulia Messina, Marco Chiappero

Studio Fieschi & soci srl

Corso Vittorio Emanuele II, 18 10123 Torino, Italy

Description of the organisation: Cleaf is a 50-year-old family-owned Italian company specializing in the production of surfaces and solutions for the furniture and interior design sectors. The manufacturing process is organized across four production sites in the Brianza area, each dedicated to one of the following divisions: faced panels, laminates, edges, and semi-finished products. This flexible model enables continuous experimentation to impart intense tactile and visual sensations to the surface coverings.

Product-related or management system-related certifications: Cleaf operates in compliance with an organisational, management and control model pursuant to Legislative Decree No. 231 of 8 June 2001, which includes:

- the Code of Ethics
- the whistleblowing policy
- the policy of adherence to the Declaration on Fundamental Principles and Rights at Work of the International Labour Organisation (ILO-1998).

Cleaf has a chain of custody management system that complies with the FSC-STD-40-004 standard.

Cleaf puts on the market melamine faced panels that comply with European regulations and those of the world's leading countries:

- Regulation (EU) No. 305/2011 of the European parliament and of the council of 9 March 2011 (CPR) on construction products (CE marking; EN 13986)
- EPA TSCA Title VI – CARB P2
- BAnz AT26.11.2018 B2
- Regulation (EC) No. 1907/2006 (REACH)
- Regulation (EU) No. 2019/1021 (POP)
- Commission Delegated Directive (EU) No. 2015/863 (RoHS III)
- Regulation (EU) No. 528/2012 (BPR)

PRODUCT INFORMATION

Product name: Melamine faced Medium Density Fiberboard.

Product identification: Melamine faced MDF available in single- or double-sided texture. The decorative surface consists of thermoset resin-impregnated paper, in a solid colour or printed design, with a surface texture. It may also include resin-impregnated kraft barrier layers.

UN CPC code: 31441 – Medium Density Fiberboard (MDF)

Product description:

The company offers over 60 textures characterized by a three-dimensional structure, achieved by engraved pressing plates for faced panels, release rolls for laminates, and mechanical embossing for edges. The textures can be combined with over 800 decor papers mostly designed by Cleaf, after impregnation with water-based thermosetting resins. Decor paper can be mass-dyed solid colours or prints from rotogravure or digital printing.

This product is designed for use in the manufacture of interior furniture, fittings and non-load bearing construction products. The product range includes specific items with improved resistance to humidity or fire.

It is not intended for exterior use.



Figure 1 - Visual representation of the product

The product is available in thicknesses ranging from 3 to 30 millimeters, with corresponding densities ranging from 960 to 720 kg/m³.

The EPD covers all combinations of thicknesses (range from 3 to 30 mm), decors (over 800), textures (over 60), and variants (for use in dry conditions, for use in humid conditions and fire resistant) of melamine faced MDF, identified by the code NM*. “NM” refers to melamine faced MDF, while “*” represents the specific product code — i.e. the specific combination of the aforementioned features.

Based on sales volumes during the reference year, the declared product was identified as the most sold configuration within the product range: dimensions 18 × 5610 × 2150 mm, with a MDF core of 4 mm thickness and 720 kg/m³ density. The panel has a single layer of resin-impregnated decorative paper on both sides.

Name and location of production site:

All products covered by this EPD are manufactured at the plant called “C1” located at Via Bottego 15, 20851 Lissone MB, Italy.

More information and explanatory materials can be found at: www.cleaf.it

Manufacturing process:

The manufacturing process begins with the retrieval of raw materials from storage. The layers for each panel are arranged according to the required specifications, which may include a MDF core, decorative resin-impregnated paper, and, if the desired finish requires it, up to three resin-impregnated kraft barrier sheets per side.

The assembled layers are hot-pressed under controlled temperature, pressure and time. This process bonds the layers together, cures the resin, and can impart the desired surface texture using engraved press plates.

After pressing, the panels are optionally cut to customer’s specified dimensions, cooled, packaged for shipment and stored inside indoor warehouses.

CONTENT DECLARATION

The content declaration refers to 1 m² of the representative product, packed and ready for delivery, consisting of a panel with dimensions of 4 × 5610 × 2150 mm. The panel features a MDF core with a thickness of 4 mm. The panel is faced on both sides with a single layer of resin-impregnated decorative paper.

The representative product was selected as the most sold configuration based on sales volume during the reference year.

The total weight of the product per declared unit equals to 3,86 kg/m².

The moisture content of the panel is in the range of 5–13%, in accordance with EN 312 and EN 322.

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
MDF board	3,78 (2,86 / 27,92)*	0,0%	39,0%	1,50
Impregnated paper	0,08 (0,08 / 0,16)*	0,0%	0,3%	0,01
Impregnated paper barrier	0,00 (0,00 / 0,23)*	0,0%	0,0%	-
TOTAL	3,86 (2,94 / 28,31)*	0,0%	39,3%	1,51

* The mass (kg) range of materials for products included in the EPD is indicated in brackets, in addition to the weight for the representative product in bold.

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit
Cardboard	0,003	0,1%	0,001
Plastic	0,0003	0,01%	-
Particle board	-	0,0%	-
Wood pallet	0,01	0,2%	0,003
TOTAL	0,01	0,2%	0,004

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO₂.

For construction products with EPDs that comply with the EN 15804 standard, the EPD must declare the substances contained in the products that are listed on the "Candidate List of Substances of Very High Concern for Authorization" when their content exceeds the thresholds for registration with the European Chemicals Agency (0.1% by weight/weight).

The articles produced by CLEAF and included in the present EPD do not contain any substances listed on the SVHC list in concentration > 0.1% w/w.

Other information on substances with hazardous and toxic properties:

Formaldehyde emissions are within the limits of:

- EN 13986, EN 14322, EN ISO 12460-3: $\leq 3.5 \text{ mg}/(\text{m}^2 \cdot \text{h})$, Class E1 (EN 13986)
- BAnz AT26.11.2018 B2, EN ISO 16516: $\leq 0.1 \text{ ppm}$, Class E1 (BAnz AT26.11.2018 B2 – E05)
- EPA TSCA Title VI / ASTM E1333-96: $\leq 0.09 \text{ ppm}$ (CARB Phase 2 – EPA TSCA Title VI).

LCA INFORMATION

Declared unit: 1 m² of faced Medium Density Fiberboard.

The representative product selected has a thickness of 4 mm and a mass of 3,86 kg/m².

Time representativeness: May 2024-April 2025

Geographical scope: Europe for Modules A1 and A2, Italy for Module A3, Global for Modules, A5, C1-C4 and D.

Database and LCA software used: Ecoinvent 3.10 – Allocation, cut-off U; SimaPro Craft, v. 10.2.0.2

EN 15804 reference package: EF 3.1

Description of system boundaries: cradle-to-gate with options, modules C1-C4, module D and optional module A5. Module A4 and modules B1-B7 are excluded.

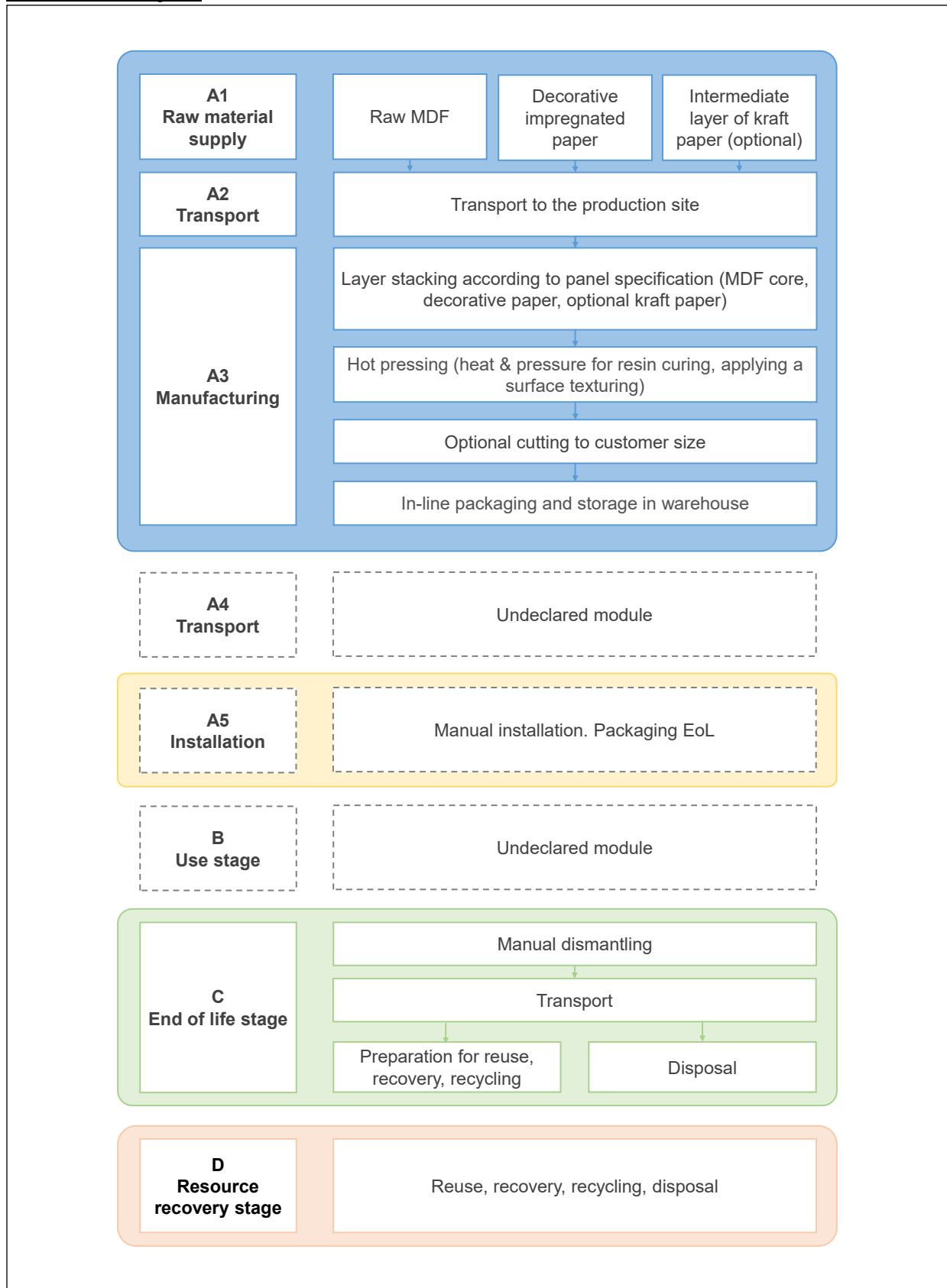
System boundaries include:

- **A1** – Raw material extraction and processing;
- **A2** – Transport of raw materials to Cleaf site;
- **A3** – Manufacturing: Manufacturing of the product, including energy use, water use, auxiliaries, emissions to air, water discharges and waste to be recovered or disposed, upstream production and transport of any losses; upstream production and transport of packaging; production of energy used in manufacturing processes;
- **A5** – Manual assembly and packaging disposal;
- **C1** – Manual disassembly;
- **C2** – Transport of waste products to treatment or disposal facilities;
- **C3** – Waste processing for reuse, recovery and/or recycling;
- **C4** – Final disposal;
- **D** – Estimate of the potential benefits and/or impacts beyond the system boundaries, related to recycling, recovery and incineration at the end of life.

System boundaries do not include:

- Infrastructure and capital goods, with exception for electricity and heat in A3 Module.
- Input and output flows related to personnel (e.g. energy used in offices, transports of employees to and from workplace, water use for toilets, etc).

Process flow diagram



More information:

CUT-OFF RULES

Cut-off allows the exclusion of negligible material and energy flows, provided that their omission does not significantly affect the overall results. The rules defined in EN 15804:2012 + A2:2019 §6.3.6 and in PCR 2019:14 §4.4 apply.

Accordingly, the following cut-off were applied: cutting fluid, degreasers, lubricants and release agents used during the manufacturing process in Module A3.

ALLOCATION METHODS

A multi-functional process is a process or system that performs more than one function. When it happens, it is necessary to decide how to properly attribute the environmental impacts generated by the system to each single product or co-product. Multifunctional processes were managed as follows:

- Manufacturing-related waste derived from raw materials (e.g., sawdust, wood shavings) was allocated based on the mass of products and co-products.
- Other manufacturing-related input and output flows, excluding the aforementioned, were allocated based on the surface area of products and co-products. This approach reflects the surface-dependent nature of the production process (e.g., hot pressing), where variations are influenced more by area than by mass.

ELECTRICITY MIX

The CLEAF C1 plant in Lissone uses self-produced electricity from a photovoltaic plant on the roof of the building and purchased electricity without specific contractual instruments. The GWP-GHG of the electricity mix used is 0.551 kg CO₂/kWh.

MODELLING OF INFRASTRUCTURE/CAPITAL GOODS

In accordance with Section 4.3.6 of PCR 2019:14 version 2.0.1, the datasets used for modelling electricity and heat include the impacts associated with the construction of the related infrastructure.

END OF LIFE SCENARIO (C1-C4):

Assumptions for the *end-of-life* scenario:

- **Module C1:** Manual dismantling is assumed for the product with negligible inputs and outputs.
- **Module C2:** A distance of 80 km (for materials not to be incinerated) and 130 km (for materials to be incinerated) by truck (16-32 metric ton, Euro 5) was assumed for the transport of materials to waste processing or disposal (PCR 2019:14, Section 4.8.4).
- **Modules C3-C4:** Waste treatment for recovery (C3) and final disposal (C4) was modelled based on the product's distribution during the reference year. End-of-life scenarios were defined per destination country, using data for the 'waste wood' category—including recycling, energy recovery, incineration, and landfill. For products shipped within Europe, country specific Eurostat data¹ were used. For products shipped outside Europe, wood waste country-specific data were applied for UK² and US³, while regional based statistics for municipal were applied for other extra-Europe countries. Weighted average scenarios were developed for Europe and Extra-Europe regions, based on country-specific or regional statistics.

¹ Eurostat, 2025. Treatment of waste by waste category, hazardousness and waste management operations. env_wastrt. https://doi.org/10.2908/ENV_WASTRT

² UK DEFRA, 2025. UK Statistics on Waste. <https://www.gov.uk/government/statistics/uk-waste-data>

³ US EPA, 2024. Wood: Material-Specific Data. <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/wood-material-specific-data>

BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (MODULE D)

The scenario modelling for potential net benefits and impacts from reuse, recovery, recycling, and incineration was carried out in accordance with EN 15804:2012 + A2:2019 + AC, Annex D, and PCR 2019:14 §4.8.5.

The analysis focused exclusively on raw materials listed in the product's Bill of Materials (BoM), excluding process waste generated in Modules A1–A3.

It includes net benefits and impacts from material recycling, energy recovery, and incineration.

Net flows of materials across the system boundary were calculated as the amount of material leaving the system for recycling or recovery, minus the amount of recycled material used in production.

For chipped wood, no losses in mass or material properties were assumed during recycling, resulting in a yield factor of $Y = 1$, as specified in PCR 2019:14 §4.8.5.

Summary of Data Quality Assessment:

As required by section 4.6.5 of the PCR, the following table provides a summary of the data quality assessment (DQA) for the datasets that contribute to at least 80% of the results for each of the declared environmental impact indicators.

Data Quality Aspect	Details / Description
Data Quality Scheme	EN 15804:2012+A2:2019, Annex E, Table E.1
Use of poor/very poor data	The datasets used to model the HDPE straps used for packaging and the incineration of wood in EoL show limited geographical representativeness. In particular, the datasets are based on global average data, which may not fully reflect the regional context of the study.
Use of Fair data with more than 30 % of a core impact	No fair data used.
Data Collection period for raw data	1/5/2024-30/4/2025
Geography	The product is manufactured in the Italy and commercialised worldwide (mainly EU).
Technology	The panels consist of an assembly of a MDF core and a resin-impregnated decorative paper sheet. Optionally, up to three intermediate barrier sheets may be inserted between the decorative surface and the core. The layers are hot-pressed to cure the resin and bond the materials together.
Geography and technology	This EPD covers particleboard panels manufactured by CLEAF with the finishes described above, produced at the "C1" plant located in Via Bottego 15, 20851 Lissone (MB), Italy. The variation in GWP-GHG results in modules A1–A3 for the product variants (worst-case and best-case) relative to the representative product amounts to -20%/+541%. All constituent elements of the finished panel — in the case of the representative product, the panel core and the decorative paper — were modelled as an average of the total input material for the respective element, considering supplies from multiple providers. This approach reflects the weighted average composition and recycled content percentages of all MDF cores and decorative papers procured during the reference period.
LCI/LCA database	Ecoinvent 3.10 – Allocation, cut-off U; SimaPro Craft, v. 10.2.0.2
EPD used	Fantoni S.p.A., EPD-IES-0018131 for product Medium density fibreboard (MDF) expires 2030-02-10 EGGER Holzwerkstoffe Brilon GmbH & Co. KG, EPD-EGG-20200250-IBC3-EN for product Medium Density Fibreboards EGGER MDF expires 09.05.2027 Unilin B.V. Division Panels, EPD-UNI-20230378-IBJ1-EN for product Unilin Medium Density Fiberboard expires 30.10.2028
Other informations	End-of-life scenarios were defined per destination country, using data for the 'waste wood' category—including recycling, energy recovery, incineration, and landfill. For products shipped within Europe, country specific Eurostat data were

used. For products shipped outside Europe, wood waste country-specific data were applied for UK and US, while regional based statistics for municipal were applied for other extra-Europe countries. Weighted average scenarios were developed for Europe and Extra-Europe regions, based on country-specific or regional statistics.

The data quality information presented in this EPD has been prepared and reported in accordance with the requirements set forth in UNI EN 15941:2024 and complies with the data quality criteria specified in EN 15804:2012+A2:2019

As requested by PCR, the following table provides information on the quality of the data used for processes contributing more than 10% to the overall GWP-GHG indicator value for the product considered.

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Production of MDF core (no upstream EPD)	EPD	EPD-IES-0018131	2025	Primary data	2%
	EPD	EPD-EGG-20200250-IBC3-EN	2021	Secondary data	0%
	EPD	EPD-UNI-20230378-IBJ1-EN	2023	Secondary data	0%
Production of MDF core (no upstream EPD)	Database	Ecoinvent v3.10	2024	Secondary data	0%
Transport of raw materials to manufacturing site	Database	EPD Owner, Ecoinvent v3.10	2024	Primary data	10%
Generation of electricity used in manufacturing of product	Database	Ecoinvent v3.10	2024	Primary data	12%
Total share of primary data, of GWP-GHG results for A1-A3					24%

**The reported share of primary data is associated with uncertainty, as two EPDs used as data source lack information on the share of primary data.*

***The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.*

A conservative approach has been adopted and only processes for which a 100% of primary data could be assessed contributes to the declared share of primary data. For this reason, primary data includes:

- Generation of electricity used in manufacturing of product;
- Transport of raw materials to manufacturing site.

Production of raw materials has been modelled using both datasets from Ecoinvent and primary data on composition.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU 27	EU 27	Italy	-	Global	-	-	-	-	-	-	-	Global	Global	Global	Global	Global
Specific data used	24%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-20%/+541%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	N/A			-	-	-	-	-	-	-	-	-	-	-	-	-	-

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

The following chapter presents the results of the LCA analysis for the products covered by the EPD, in accordance with EN 15804:2012 + A2:2019 + AC and PCR 2019:14.

All results are expressed per the declared unit of the product under study.

The results presented in the following sections refer to the representative product analysed. Please refer to the following chapter, entitled 'Additional LCA results', for a comparison with the results for the worst-case and best-case products, together with the results for the 100% scenarios.

The difference between the declared product GWP-GHG result, and the products with GWP-GHG results furthest away, for modules A1-A3, is -20%/+541%. This variation is primarily due to differences in panel weight per square meter, which depend on thickness.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Some upstream datasets used to model incoming raw materials are based on the supplier's EPDs, developed using EF 3.0, which is considered a more conservative method compared to the current EF methodology. According to the assessment performed, the use of these datasets is expected to result in environmental impacts that are equal to or more conservative than those obtained using datasets fully aligned with the current EF version, in accordance with PCR 2019:14 §4.6.4.

The primary energy use indicators are calculated according to Annex 3 of PCR 2019:14 v2.0.1, Option B.

Mandatory impact category indicators according to EN 15804

Results per declared unit								
Indicator	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	-2,04E+00	1,69E-02	0,00E+00	5,38E-02	5,63E+00	1,08E-01	-4,84E-01
GWP-fossil	kg CO ₂ eq.	3,67E+00	7,38E-04	0,00E+00	5,38E-02	3,02E-02	2,77E-04	-4,81E-01
GWP-biogenic	kg CO ₂ eq.	-5,72E+00	1,62E-02	0,00E+00	2,03E-06	5,60E+00	1,08E-01	-6,81E-04
GWP-luluc	kg CO ₂ eq.	4,05E-03	1,52E-07	0,00E+00	1,32E-06	7,35E-05	1,26E-07	-2,04E-03
ODP	kg CFC 11 eq.	8,44E-08	7,74E-12	0,00E+00	1,10E-09	4,73E-10	7,34E-12	-1,42E-08
AP	mol H ⁺ eq.	1,68E-02	2,06E-06	0,00E+00	1,34E-04	2,19E-04	2,07E-06	-1,27E-03
EP-freshwater	kg P eq.	1,30E-04	5,49E-09	0,00E+00	4,51E-08	2,32E-06	4,63E-09	-4,28E-05
EP-marine	kg N eq.	4,95E-03	9,02E-07	0,00E+00	5,13E-05	6,81E-05	1,37E-06	-2,28E-04
EP-terrestrial	mol N eq.	5,88E-02	8,52E-06	0,00E+00	5,62E-04	7,32E-04	8,99E-06	-2,42E-03
POCP	kg NMVOC eq.	1,95E-02	3,07E-06	0,00E+00	2,34E-04	1,93E-04	3,55E-06	-1,46E-03

ADP-minerals&metals*	kg Sb eq.	2,00E-06	6,71E-11	0,00E+00	1,78E-09	2,55E-09	1,05E-10	-1,71E-08
ADP-fossil*	MJ	6,46E+01	6,20E-03	0,00E+00	7,10E-01	6,11E-01	6,23E-03	-9,28E+00
WDP*	m ³	2,42E+00	-4,00E-04	0,00E+00	4,27E-04	7,23E-03	-4,25E-03	-7,00E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption							

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators

Results per declared unit								
Indicator	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-GHG ⁴	kg CO ₂ eq.	3,68E+00	9,82E-04	0,00E+00	5,38E-02	3,04E-02	1,91E-03	-4,84E-01

Additional voluntary environmental impact indicators are not declared in this EPD.

Resource use indicators

Results per declared unit								
Indicator	Unit	A1-A3	A5	C1	C2	C3	C4	D
PERE	MJ	7,12E+00	1,65E-04	0,00E+00	2,51E-03	1,32E-01	6,28E-05	-1,53E+01
PERM	MJ	5,51E+01	-8,79E-02	0,00E+00	0,00E+00	-4,51E+01	-6,84E-03	0,00E+00
PERT	MJ	6,23E+01	-8,77E-02	0,00E+00	2,51E-03	-4,49E+01	-6,78E-03	-1,53E+01
PENRE	MJ	5,80E+01	6,20E-03	0,00E+00	7,10E-01	6,11E-01	6,23E-03	9,28E+00
PENRM	MJ.	7,08E+00	-1,30E-02	0,00E+00	0,00E+00	-5,61E+00	-8,51E-04	0,00E+00
PENRT	MJ	6,51E+01	-6,75E-03	0,00E+00	7,10E-01	-5,00E+00	5,38E-03	9,28E+00
SM	kg	3,94E-04	0,00E+00	0,00E+00	9,96E-08	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	8,52E-01	3,58E-06	0,00E+00	1,29E-04	5,95E-03	-9,04E-05	-1,70E-01
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

⁴ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Waste indicators

Results per declared unit								
Indicator	Unit	A1-A3	A5	C1	C2	C3	C4	D
Hazardous waste disposed *	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed *	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	4,10E-04	3,82E-09	0,00E+00	4,78E-08	4,08E-06	1,17E-09	-3,63E-05

* The indicators "Hazardous waste disposed" and "Non-hazardous waste disposed" are set to 0 because all relevant waste treatment processes are included within the system boundaries.

Output flow indicators

Results per declared unit								
Indicator	Unit	A1-A3	A5	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	2,56E-01	4,94E-03	0,00E+00	0,00E+00	3,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electrical energy	MJ	0,00E+00	5,61E-03	0,00E+00	0,00E+00	2,29E+00	0,00E+00	0,00E+00
Exported thermal energy	MJ	0,00E+00	1,14E-02	0,00E+00	0,00E+00	4,65E+00	0,00E+00	0,00E+00

Additional LCA results of the product(s)

As per the PCR, complementary results for the 100% recycling, 100% energy recovery, 100% incineration and 100% landfill end-of-life scenarios are provided below for moules C and D.

Mandatory impact category indicators according to EN 15804 – 100% recycling

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	0,00E+00	5,38E-02	5,73E+00	0,00E+00	-1,52E-02
GWP-fossil	kg CO ₂ eq.	0,00E+00	5,38E-02	2,54E-02	0,00E+00	-1,33E-02
GWP-biogenic	kg CO ₂ eq.	0,00E+00	2,03E-06	5,71E+00	0,00E+00	-2,17E-04
GWP-luluc	kg CO ₂ eq.	0,00E+00	1,32E-06	7,52E-05	0,00E+00	-1,75E-03
ODP	kg CFC 11 eq.	0,00E+00	1,10E-09	3,77E-10	0,00E+00	-2,09E-10
AP	mol H ⁺ eq.	0,00E+00	1,34E-04	1,25E-04	0,00E+00	-6,39E-05
EP-freshwater	kg P eq.	0,00E+00	4,51E-08	2,34E-06	0,00E+00	-2,86E-05

EP-marine	kg N eq.	0,00E+00	5,13E-05	1,69E-05	0,00E+00	-2,29E-05
EP-terrestrial	mol N eq.	0,00E+00	5,62E-04	1,90E-04	0,00E+00	-1,37E-04
POCP	kg NMVOC eq.	0,00E+00	2,34E-04	6,26E-05	0,00E+00	-5,73E-04
ADP-minerals&metals*	kg Sb eq.	0,00E+00	1,78E-09	1,68E-09	0,00E+00	-3,67E-09
ADP-fossil*	MJ	0,00E+00	7,10E-01	5,85E-01	0,00E+00	-3,26E-01
WDP*	m ³	0,00E+00	4,27E-04	6,41E-03	0,00E+00	-1,32E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption					

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators – 100% recycling

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
GWP-GHG ⁵	kg CO ₂ eq.	0,00E+00	5,38E-02	2,55E-02	0,00E+00	-1,52E-02

Additional voluntary environmental impact indicators are not declared in this EPD.

Resource use indicators – 100% recycling

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
PERE	MJ	0,00E+00	2,51E-03	1,34E-01	0,00E+00	-1,80E+01
PERM	MJ	0,00E+00	0,00E+00	-5,05E+01	0,00E+00	0,00E+00
PERT	MJ	0,00E+00	2,51E-03	-5,03E+01	0,00E+00	-1,80E+01
PENRE	MJ	0,00E+00	7,10E-01	5,85E-01	0,00E+00	-3,26E-01
PENRM	MJ.	0,00E+00	0,00E+00	-6,28E+00	0,00E+00	0,00E+00
PENRT	MJ	0,00E+00	7,10E-01	-5,69E+00	0,00E+00	-3,26E-01
SM	kg	0,00E+00	9,96E-08	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	0,00E+00	1,29E-04	5,05E-03	0,00E+00	-2,01E-03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-					

⁵ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste indicators – 100% recycling

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
Hazardous waste disposed *	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed *	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	0,00E+00	4,78E-08	4,12E-06	0,00E+00	-2,03E-06

* The indicators "Hazardous waste disposed" and "Non-hazardous waste disposed" are set to 0 because all relevant waste treatment processes are included within the system boundaries.

Output flow indicators – 100% recycling

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	3,86E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electrical energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Mandatory impact category indicators according to EN 15804 – 100% Energy recovery

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	0,00E+00	5,38E-02	5,77E+00	0,00E+00	-2,41E+00
GWP-fossil	kg CO ₂ eq.	0,00E+00	5,38E-02	5,98E-02	0,00E+00	-2,40E+00
GWP-biogenic	kg CO ₂ eq.	0,00E+00	2,03E-06	5,71E+00	0,00E+00	-2,62E-03
GWP-luluc	kg CO ₂ eq.	0,00E+00	1,32E-06	7,70E-05	0,00E+00	-3,28E-03
ODP	kg CFC 11 eq.	0,00E+00	1,10E-09	9,31E-10	0,00E+00	-7,23E-08
AP	mol H ⁺ eq.	0,00E+00	1,34E-04	6,64E-04	0,00E+00	-6,17E-03
EP-freshwater	kg P eq.	0,00E+00	4,51E-08	2,66E-06	0,00E+00	-1,02E-04

EP-marine	kg N eq.	0,00E+00	5,13E-05	2,95E-04	0,00E+00	-1,05E-03
EP-terrestrial	mol N eq.	0,00E+00	5,62E-04	3,13E-03	0,00E+00	-1,16E-02
POCP	kg NMVOC eq.	0,00E+00	2,34E-04	7,78E-04	0,00E+00	-5,05E-03
ADP-minerals&metals*	kg Sb eq.	0,00E+00	1,78E-09	6,65E-09	0,00E+00	-7,25E-08
ADP-fossil*	MJ	0,00E+00	7,10E-01	8,33E-01	0,00E+00	-4,63E+01
WDP*	m ³	0,00E+00	4,27E-04	1,22E-02	0,00E+00	-3,04E-01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption					

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators – 100% Energy recovery

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
GWP-GHG ⁶	kg CO ₂ eq.	0,00E+00	5,38E-02	6,00E-02	0,00E+00	-2,41E+00

Additional voluntary environmental impact indicators are not declared in this EPD.

Resource use indicators – 100% Energy recovery

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
PERE	MJ	0,00E+00	2,51E-03	1,38E-01	0,00E+00	-5,84E+00
PERM	MJ	0,00E+00	0,00E+00	-3,03E+01	0,00E+00	0,00E+00
PERT	MJ	0,00E+00	2,51E-03	-3,01E+01	0,00E+00	-5,84E+00
PENRE	MJ	0,00E+00	7,10E-01	8,33E-01	0,00E+00	-4,63E+01
PENRM	MJ.	0,00E+00	0,00E+00	-3,77E+00	0,00E+00	0,00E+00
PENRT	MJ	0,00E+00	7,10E-01	-2,93E+00	0,00E+00	-4,63E+01
SM	kg	0,00E+00	9,96E-08	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	0,00E+00	1,29E-04	1,07E-02	0,00E+00	-8,68E-01
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-					

⁶ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste indicators – 100% Energy recovery

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
Hazardous waste disposed *	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed *	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	0,00E+00	4,78E-08	4,20E-06	0,00E+00	-1,79E-04

* The indicators "Hazardous waste disposed" and "Non-hazardous waste disposed" are set to 0 because all relevant waste treatment processes are included within the system boundaries.

Output flow indicators – 100% Energy recovery

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electrical energy	MJ	0,00E+00	0,00E+00	1,19E+01	0,00E+00	0,00E+00
Exported thermal energy	MJ	0,00E+00	0,00E+00	2,43E+01	0,00E+00	0,00E+00

Mandatory impact category indicators according to EN 15804 – 100% Landfill

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	0,00E+00	5,38E-02	0,00E+00	5,98E+00	0,00E+00
GWP-fossil	kg CO ₂ eq.	0,00E+00	5,38E-02	0,00E+00	3,55E-02	0,00E+00
GWP-biogenic	kg CO ₂ eq.	0,00E+00	2,03E-06	0,00E+00	5,94E+00	0,00E+00
GWP-luluc	kg CO ₂ eq.	0,00E+00	1,32E-06	0,00E+00	3,47E-06	0,00E+00
ODP	kg CFC 11 eq.	0,00E+00	1,10E-09	0,00E+00	1,22E-09	0,00E+00
AP	mol H ⁺ eq.	0,00E+00	1,34E-04	0,00E+00	2,30E-04	0,00E+00
EP-freshwater	kg P eq.	0,00E+00	4,51E-08	0,00E+00	2,01E-07	0,00E+00
EP-marine	kg N eq.	0,00E+00	5,13E-05	0,00E+00	1,71E-04	0,00E+00

EP-terrestrial	mol N eq.	0,00E+00	5,62E-04	0,00E+00	1,09E-03	0,00E+00
POCP	kg NMVOC eq.	0,00E+00	2,34E-04	0,00E+00	4,98E-04	0,00E+00
ADP-minerals&metals*	kg Sb eq.	0,00E+00	1,78E-09	0,00E+00	1,61E-08	0,00E+00
ADP-fossil*	MJ	0,00E+00	7,10E-01	0,00E+00	8,43E-01	0,00E+00
WDP*	m ³	0,00E+00	4,27E-04	0,00E+00	-4,53E-02	0,00E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption					

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators – 100% Landfill

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
GWP-GHG ⁷	kg CO ₂ eq.	0,00E+00	5,38E-02	0,00E+00	2,71E-01	0,00E+00

Additional voluntary environmental impact indicators are not declared in this EPD.

Resource use indicators – 100% Landfill

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
PERE	MJ	0,00E+00	2,51E-03	0,00E+00	1,94E-02	0,00E+00
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	0,00E+00	2,51E-03	0,00E+00	1,94E-02	0,00E+00
PENRE	MJ	0,00E+00	7,10E-01	0,00E+00	8,43E-01	0,00E+00
PENRM	MJ.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	0,00E+00	7,10E-01	0,00E+00	8,43E-01	0,00E+00
SM	kg	0,00E+00	9,96E-08	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	0,00E+00	1,29E-04	0,00E+00	-1,66E-02	0,00E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources;					

⁷ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste indicators – 100% Landfill

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
Hazardous waste disposed *	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed *	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	0,00E+00	4,78E-08	0,00E+00	2,49E-07	0,00E+00

* The indicators "Hazardous waste disposed" and "Non-hazardous waste disposed" are set to 0 because all relevant waste treatment processes are included within the system boundaries.

Output flow indicators – 100% Landfill

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electrical energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Mandatory impact category indicators according to EN 15804 – 100% Incineration

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	0,00E+00	5,38E-02	0,00E+00	5,74E+00	-2,01E+00
GWP-fossil	kg CO ₂ eq.	0,00E+00	5,38E-02	0,00E+00	3,44E-02	-2,00E+00
GWP-biogenic	kg CO ₂ eq.	0,00E+00	2,03E-06	0,00E+00	5,71E+00	-2,18E-03
GWP-luluc	kg CO ₂ eq.	0,00E+00	1,32E-06	0,00E+00	1,81E-06	-2,73E-03
ODP	kg CFC 11 eq.	0,00E+00	1,10E-09	0,00E+00	5,53E-10	-6,02E-08
AP	mol H ⁺ eq.	0,00E+00	1,34E-04	0,00E+00	5,39E-04	-5,15E-03
EP-freshwater	kg P eq.	0,00E+00	4,51E-08	0,00E+00	3,12E-07	-8,49E-05
EP-marine	kg N eq.	0,00E+00	5,13E-05	0,00E+00	2,78E-04	-8,73E-04

EP-terrestrial	mol N eq.	0,00E+00	5,62E-04	0,00E+00	2,94E-03	-9,66E-03
POCP	kg NMVOC eq.	0,00E+00	2,34E-04	0,00E+00	7,15E-04	-4,21E-03
ADP-minerals&metals*	kg Sb eq.	0,00E+00	1,78E-09	0,00E+00	4,97E-09	-6,04E-08
ADP-fossil*	MJ	0,00E+00	7,10E-01	0,00E+00	2,48E-01	-3,86E+01
WDP*	m³	0,00E+00	4,27E-04	0,00E+00	5,78E-03	-2,54E-01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption					

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators – 100% Incineration

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
GWP-GHG ⁸	kg CO ₂ eq.	0,00E+00	5,38E-02	0,00E+00	3,45E-02	-2,01E+00

Additional voluntary environmental impact indicators are not declared in this EPD.

Resource use indicators – 100% Incineration

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
PERE	MJ	0,00E+00	2,51E-03	0,00E+00	4,44E-03	-4,87E+00
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	-2,52E+01	0,00E+00
PERT	MJ	0,00E+00	2,51E-03	0,00E+00	-2,52E+01	-4,87E+00
PENRE	MJ	0,00E+00	7,10E-01	0,00E+00	2,48E-01	-3,86E+01
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	-3,14E+00	0,00E+00
PENRT	MJ	0,00E+00	7,10E-01	0,00E+00	-2,89E+00	-3,86E+01
SM	kg	0,00E+00	9,96E-08	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m³	0,00E+00	1,29E-04	0,00E+00	5,68E-03	-7,24E-01
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources;					

⁸ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste indicators – 100% Incineration

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
Hazardous waste disposed *	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed *	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	0,00E+00	4,78E-08	0,00E+00	8,40E-08	-1,49E-04

* The indicators "Hazardous waste disposed" and "Non-hazardous waste disposed" are set to 0 because all relevant waste treatment processes are included within the system boundaries.

Output flow indicators – 100% Incineration

Results per declared unit						
Indicator	Unit	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electrical energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Variations among the included products

As follows the aggregated results of environmental impact indicators across all included modules (from A to C) are presented for the products furthest away from the declared results (specifically, those with lowest and the highest panel thickness). This variation is primarily due to differences in panel weight per square meter, which depend on thickness.

LCA result of one declared unit product (A-C)	Unit	Min	Representative product	Max	Variation (%)
GWP-total	kg CO2 eq.	3,03E+00	3,77E+00	2,43E+01	-20% / +544%
GWP-fossil	kg CO2 eq.	3,02E+00	3,76E+00	2,42E+01	-20% / +543%
GWP-biogenic	kg CO2 eq.	5,11E-03	7,49E-03	5,99E-02	-32% / +700%
GWP-luluc	kg CO2 eq.	3,17E-03	4,12E-03	3,07E-02	-23% / +645%
ODP	kg CFC 11 eq.	7,08E-08	8,60E-08	5,15E-07	-18% / +499%
AP	mol H+ eq.	1,34E-02	1,71E-02	1,18E-01	-22% / +586%
EP-freshwater	kg P eq.	1,03E-04	1,32E-04	9,31E-04	-22% / +604%
EP- marine	kg N eq.	3,95E-03	5,07E-03	3,54E-02	-22% / +598%
EP-terrestrial	mol N eq.	4,68E-02	6,01E-02	4,20E-01	-22% / +598%
POCP	kg NMVOC eq.	1,56E-02	1,99E-02	1,37E-01	-22% / +590%

LCA result of one declared unit product (A-C)	Unit	Min	Representative product	Max	Variation (%)
ADP-minerals&metals*	kg Sb eq.	1,72E-06	2,01E-06	9,77E-06	-14% / +386%
ADP-fossil*	kg CO2 eq.	5,29E+01	6,59E+01	4,30E+02	-20% / +552%
WDP*	kg CO2 eq.	1,92E+00	2,42E+00	1,61E+01	-21% / +566%
GWP-GHG	kg CO2 eq.	3,03E+00	3,77E+00	2,42E+01	-20% / +543%
PERE	MJ	5,73E+00	7,25E+00	4,95E+01	-21% / +582%
PERM	MJ	7,52E+00	9,99E+00	7,34E+01	-25% / +634%
PERT	MJ	1,32E+01	1,72E+01	1,23E+02	-23% / +612%
PENRE	MJ	4,77E+01	5,93E+01	3,82E+02	-20% / +544%
PENRM	MJ	1,20E+00	1,46E+00	9,76E+00	-18% / +570%
PENRT	MJ	4,89E+01	6,08E+01	3,92E+02	-20% / +545%
SM	kg	2,98E-04	3,94E-04	2,94E-03	-24% / +646%
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0% / +0%
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0% / +0%
FW	m3	7,12E-01	8,58E-01	4,96E+00	-17% / +478%
HWD	kg	0,00E+00	0,00E+00	0,00E+00	0% / +0%
NHWD	kg	0,00E+00	0,00E+00	0,00E+00	0% / +0%
RWD	kg	3,15E-04	4,14E-04	3,04E-03	-24% / +633%
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0% / +0%
MFR	kg	2,55E+00	3,26E+00	2,25E+01	-22% / +589%
MER	kg	0,00E+00	0,00E+00	0,00E+00	0% / +0%
EEE	MJ	1,75E+00	2,29E+00	1,69E+01	-24% / +635%
EET	MJ	3,54E+00	4,66E+00	3,42E+01	-24% / +635%

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO ₂ eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO ₂ eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO ₂ eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO ₂ eq.)
GWP-total	Total Global Warming Potential (kg CO ₂ eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO ₂ eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H ⁺ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m ³)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m ³)
Waste Indicators	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)

MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy, Electricity (MJ)
EET	Exported Energy, Thermal (MJ)
Lifecycle Stages / Modules	
A1	Raw material supply
A2	Transport
A3	Manufacturing
A4	Transport to site
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
Other Relevant Terms	
SVHC	Substances of Very High Concern
EC No.	European Community Number
CAS No.	Chemical Abstracts Service Number
MJ	Megajoule
kg	Kilogram
m ³	Cubic Meter
NM VOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO ₂ eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO ₂ eq.	Kilograms of Carbon Dioxide Equivalent
ND	Not Declared

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VERSION HISTORY

Original Version of the EPD, 2025-09-23.

